

ABSTRACT OF THE DISCLOSURE

A method for attenuating water layer multiples from a gather of seismic data traces. The method includes predicting a plurality of receiver side water layer multiples in the gather of seismic data traces using a convolutional operator derived from a water layer model, adaptively subtracting the receiver side water layer multiples from the gather of seismic data traces, predicting a plurality of source side water layer multiples using the convolutional operator derived from the water layer model, and adaptively subtracting the receiver side water layer multiples and the source side water layer multiples from the gather of seismic data traces to generate a plurality of primaries in the gather of seismic data traces.